Mesenchymal Stem Cells Respond to Hypoxia by Increasing Diacylglycerols.

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Public Summary:
Mesenchymal stem cells (MSC) are currently being tested clinically for a plethora of conditions, with most approaches relying on the secretion of paracrine signals by MSC to modulate the immune system, promote wound healing and induce angiogenesis. Hypoxia has been shown to affect MSC proliferation, differentiation, survival and secretory profile. Here, we investigate changes in the lipid composition of human bone marrow-derived MSC after exposure to hypoxia. Using mass spectrometry, we compared the lipid profiles of MSC derived from five different donors, cultured for two days in either normoxia (control) or hypoxia (1% oxygen). Hypoxia induced a significant increase of total triglycerides, fatty acids and diacylglycerols (DG). Remarkably, reduction of DG levels using the phosphatidylcholine-specific phospholipase C inhibitor D609 inhibited the secretion of VEGF and Angiopoietin-2, but increased the secretion of interleukin-8, without affecting significantly their respective mRNA levels. Functionally, incubation of MSC in hypoxia with D609 inhibited the potential of the cells to promote migration of human endothelial cells in a wound/scratch assay. Hence, we show that hypoxia induces in MSC an increase of DG that may affect the angiogenic potential of these cells. This article is protected by copyright. All rights reserved.

Scientific Abstract:
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